FIG. 1

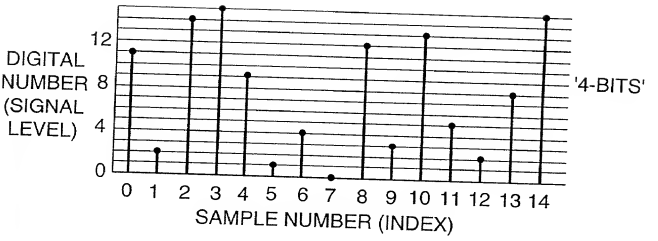
DIGITAL NUMBER (SIGNAL LEVEL)
12
8
4
0
'4-BITS'
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
SAMPLE NUMBER (INDEX)

FIG. 4

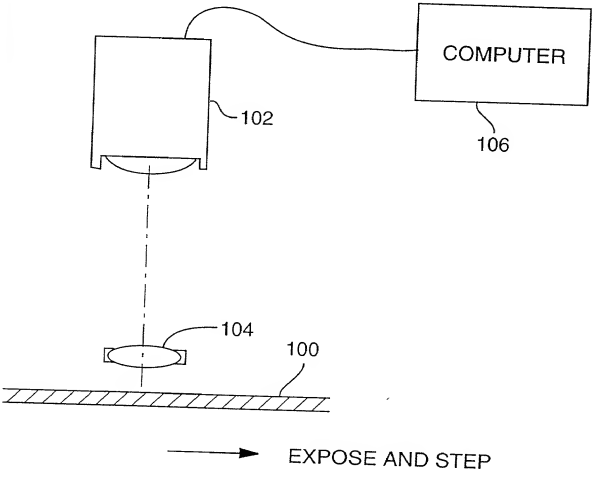
COMPUTER
102
106
104
100
EXPOSE AND STEP

FIG. 2

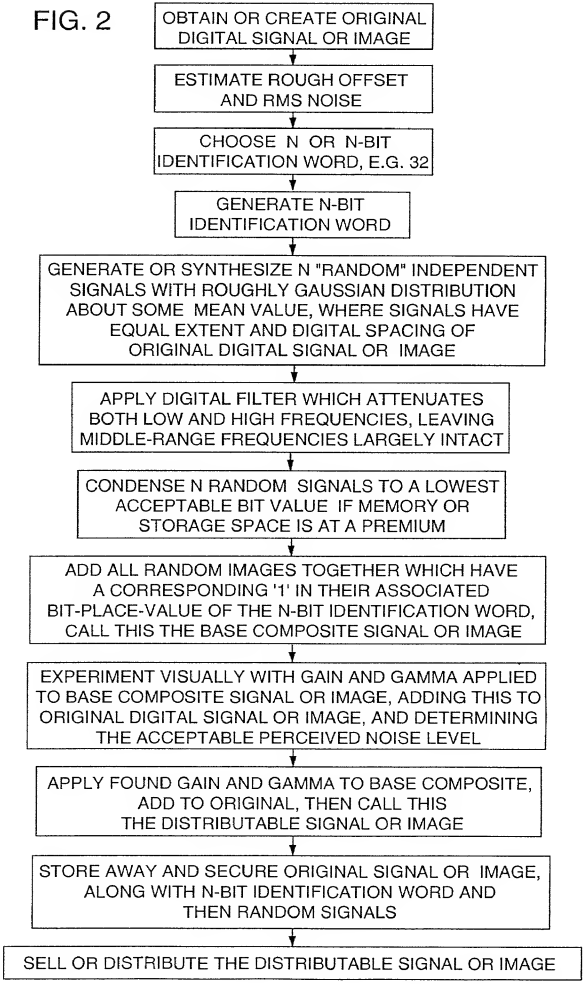

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FIG. 3

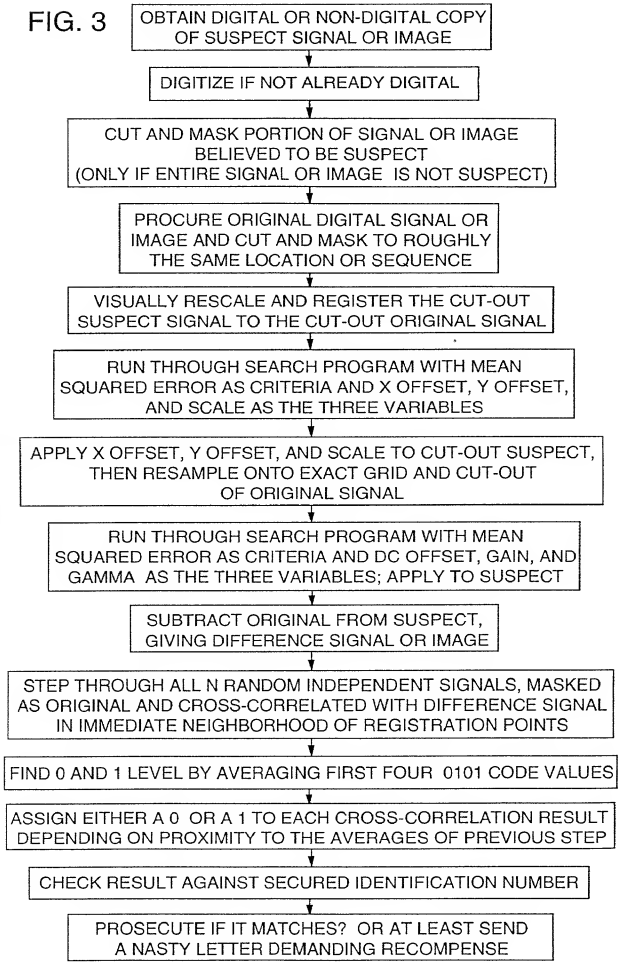

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FIG. 5

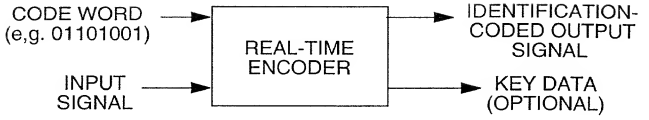
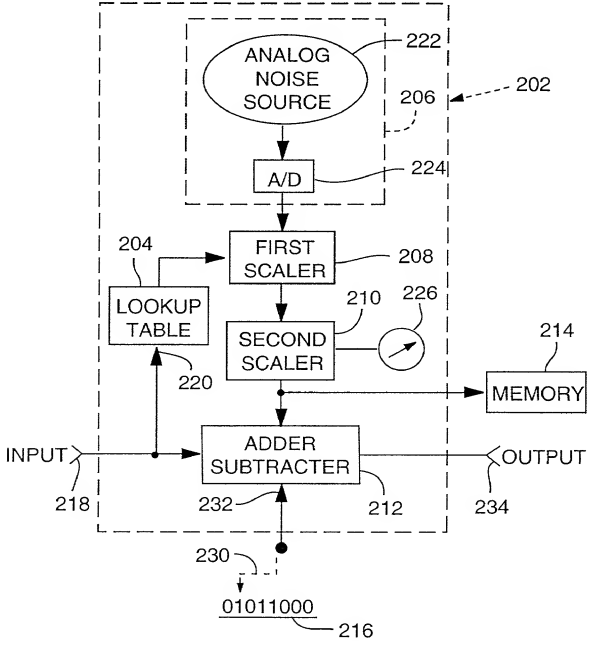


FIG. 6



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09169207.072501

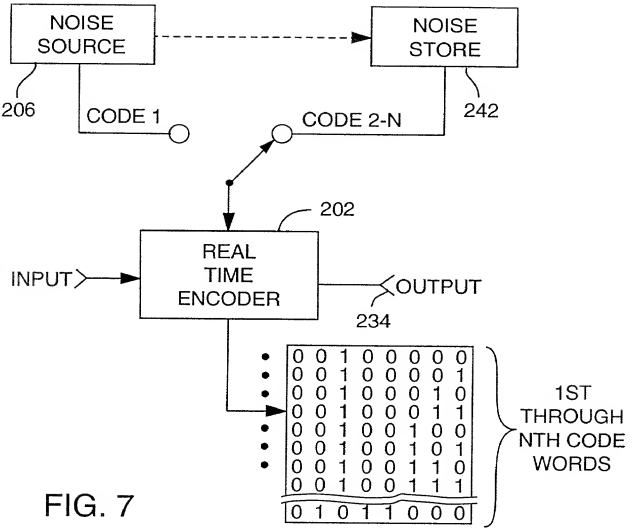

FIG. 7

FIG. 8

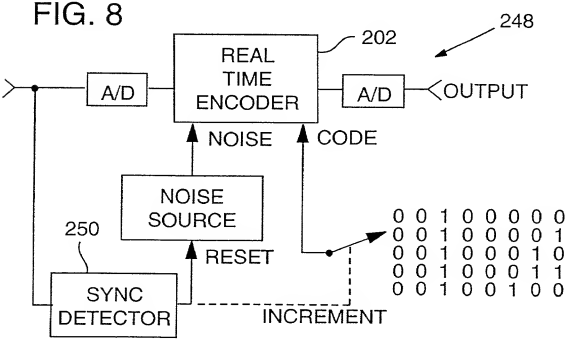

FIG. 9A

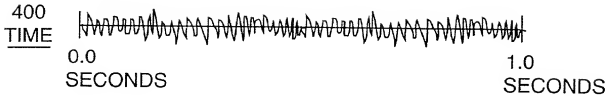

FIG. 9B

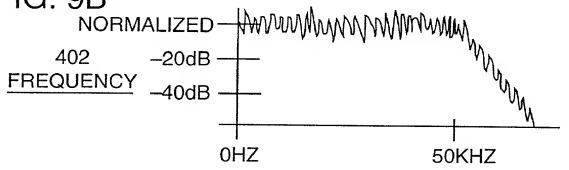

FIG. 9C

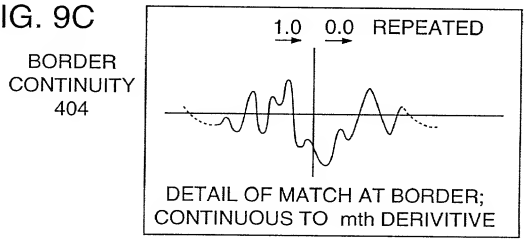

FIG. 10

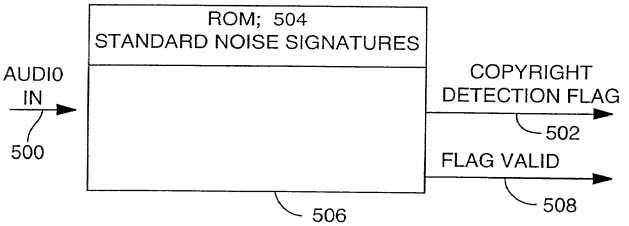

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FIG. 11

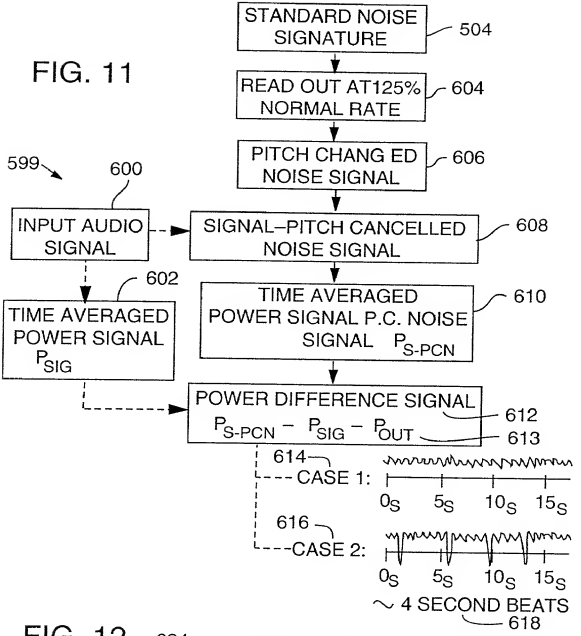
STANDARD NOISE SIGNATURE
504
READ OUT AT125% NORMAL RATE
604
PITCH CHANG ED NOISE SIGNAL
606
599
600
INPUT AUDIO SIGNAL
SIGNAL–PITCH CANCELLED NOISE SIGNAL
608
602
TIME AVERAGED POWER SIGNAL P_{SIG}
TIME AVERAGED POWER SIGNAL P.C. NOISE SIGNAL P_{S-PCN}
610
POWER DIFFERENCE SIGNAL
$P_{S-PCN} - P_{SIG} - P_{OUT}$
612
613
614
CASE 1:
0_S 5_S 10_S 15_S
616
CASE 2:
0_S 5_S 10_S 15_S
4 SECOND BEATS
618

FIG. 12

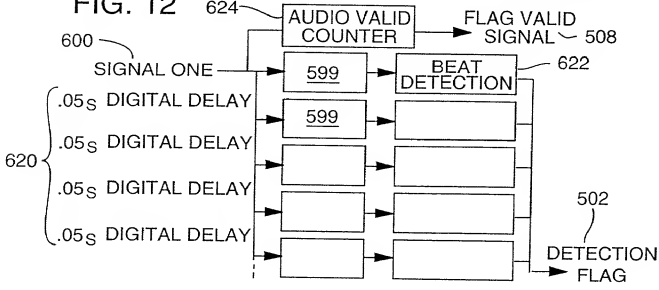
624
AUDIO VALID COUNTER
FLAG VALID SIGNAL
508
600
SIGNAL ONE
599
BEAT DETECTION
622
620
.05$_S$ DIGITAL DELAY
599
.05$_S$ DIGITAL DELAY
.05$_S$ DIGITAL DELAY
.05$_S$ DIGITAL DELAY
502
DETECTION FLAG

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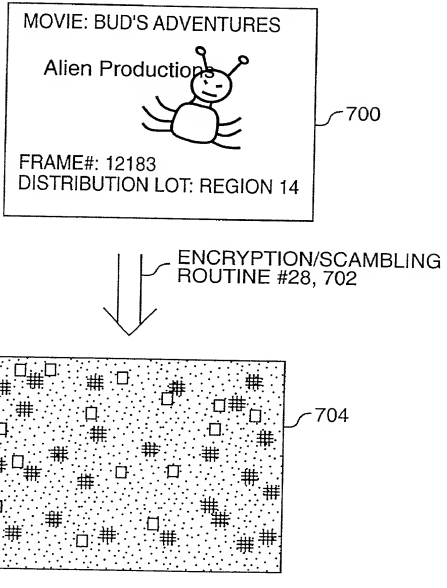
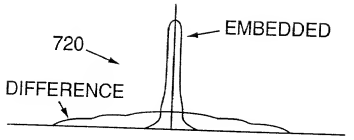
FIG. 13



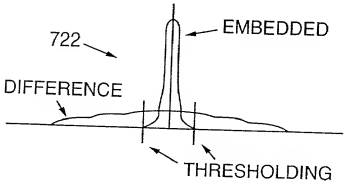
PSEUDO-RANDOM MASTER SNOWY IMAGE
(SCALED DOWN AND ADDED TO FRAME 12183

09915207.072501

FIG. 14



MEAN-REMOVED HISTOGRAMS OF DIFFERENCE SIGNAL AND KNOWN EMBEDDED CODE SIGNAL



722, MEAN-REMOVED HISTOGRAMS OF FIRST DERIVATIVES (OR SCALER GRADIENTS IN CASE OF AN IMAGE)

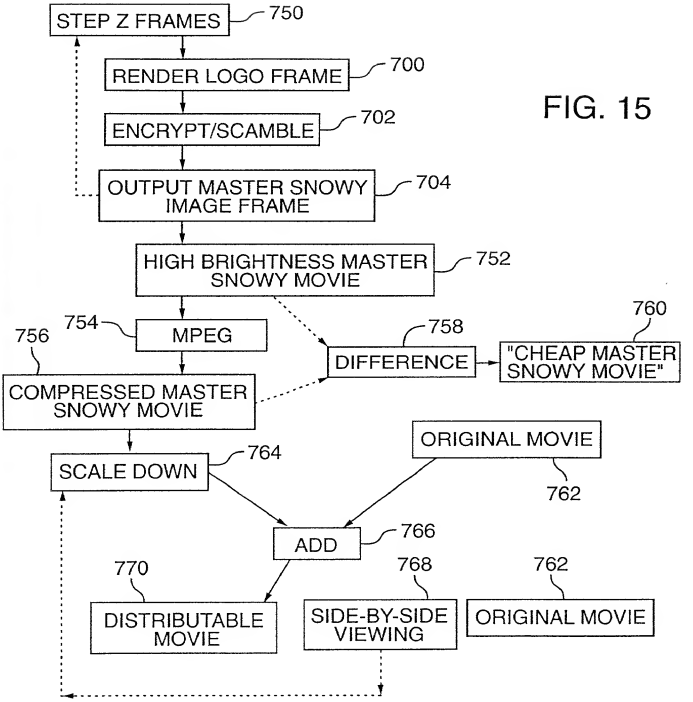
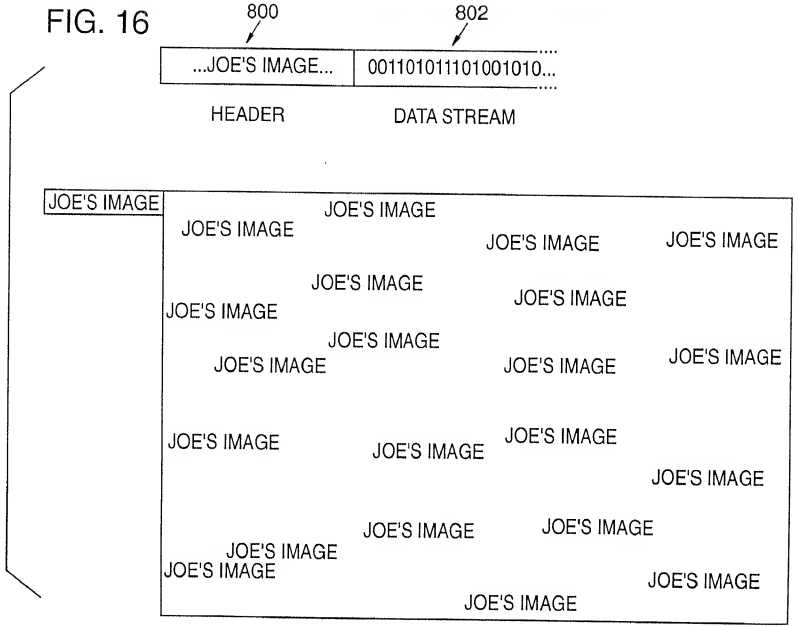


FIG. 15

09162007.072501

FIG. 16


800
802
...JOE'S IMAGE...
001101011101001010...
HEADER
DATA STREAM
JOE'S IMAGE
JOE'S IMAGE
JOE'S IMAGE
JOE'S IMAGE
JOE'S IMAGE
JOE'S IMAGE
JOE'S IMAGE
JOE'S IMAGE
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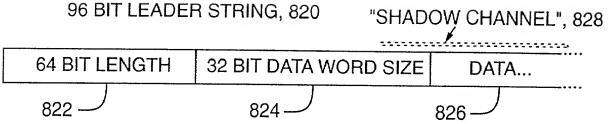
JOE'S IMAGE
JOE'S IMAGE

FIG. 17



UNIVERSAL EMPIRICAL DATA FORMAT

FIG. 18

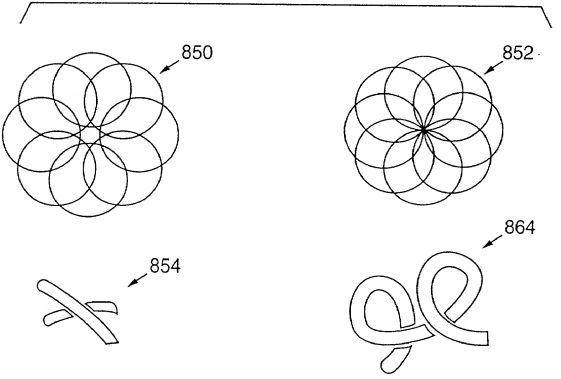
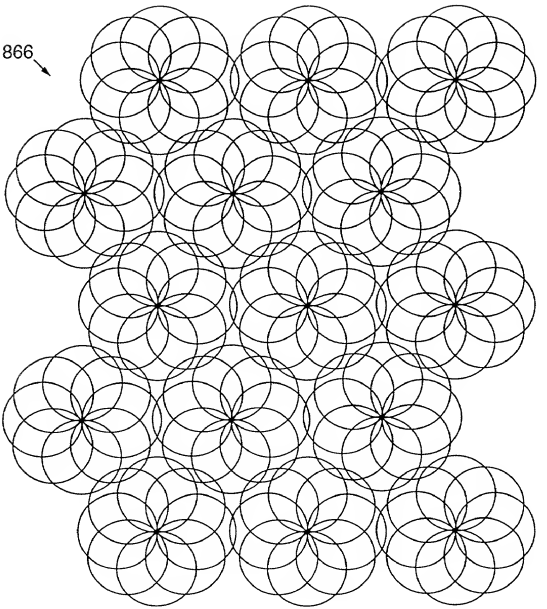
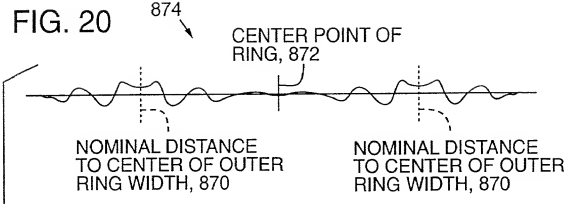


FIG. 19



QUEST FOR MOSALCED KNOT PATTERNS WHICH "COVER" AND ARE COEXTENSIVE WITH ORIGINAL IMAGE;
ALL ELEMENTAL KNOT PATTERNS CAN CONVEY THE SAME INFORMATION, SUCH AS A SIGNATURE, OR EACH CAN CONVEY A NEW MESSAGE IN A STEGANOGRAPHIC SENSE

FIG. 20



2-D BRIGHTNESS OF PHASE-ONLY FILTERED RING IS SIMILAR TO THE ABOVE BRIGHTNESS PATTERN ROTATED ABOUT CENTRAL POINT OF RING:

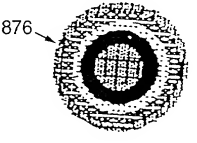


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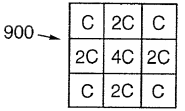
FIG. 21A

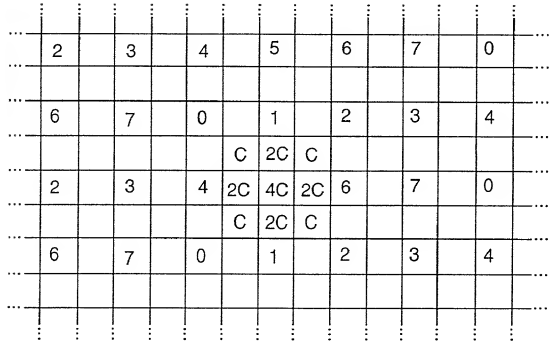


WHERE C = 1/16

ELEMENTARY BUMP
(DEFINED GROUPING OF PIXELS WITH WEIGHT VALUES)

09162207.072501

FIG. 21B



EXAMPLE OF HOW MANY ELEMENTARY BUMPS, 900, WOULD BE ASSIGNED LOCATIONS IN AN IMAGE, AND THOSE LOCATIONS WOULD BE ASSOCIATED WITH A CORRESPONDING BIT PLANE IN THE N-BIT WORD, HERE TAKEN AS N=8 WITH INDEXES OF 0-7. ONE LOCATION, ASSOCIATED WITH BIT PLANE "5", HAS THE OVERLAY OF THE BUMP PROFILE DEPICTED.

09915207.072501

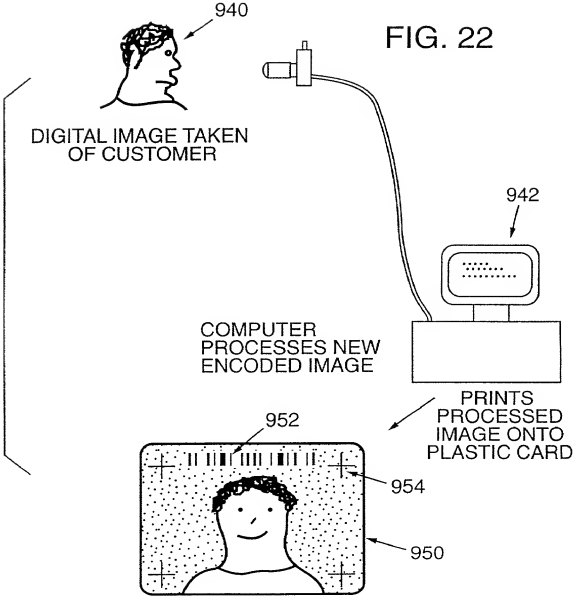
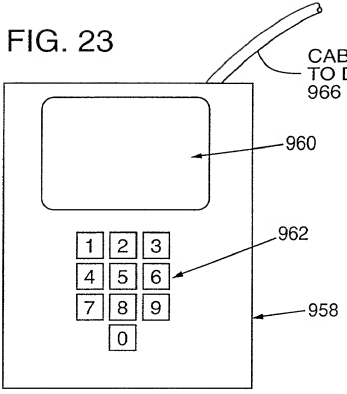


FIG. 22

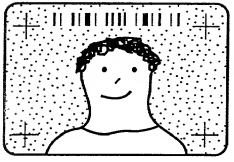
FIG. 23



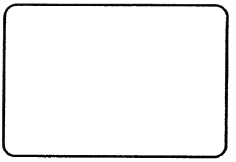
CONTAINS RUDIMENTARY OPTICAL SCANNER, MEMORY BUFFERS, COMMUNICATIONS DEVICES, AND MICROPROCESSOR

CONSUMER MERELY PLACES CARD INTO WINDOW AND CAN, AT THEIR PREARRANGED OPTION, EITHER TYPE IN A PERSONAL IDENTIFICATION NUMBER (PIN, FOR ADDED SECURITY) OR NOT. THE TRANSACTION IS APPROVED OR DISAPPROVED WITHIN SECONDS.

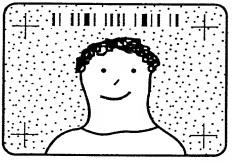
FIG. 24



ORIGINAL DIGITAL IMAGE WITH BARCODE AND FIDUCIALS ADDED, 970



COMPUTER GENERATES MASTER SNOWY IMAGE 972, WHICH IS GENERALLY ORTHOGONAL TO ORIGINAL IMAGE AT LEFT



COMBINED TO FORM PERSONAL CASH CARD, 950

09615207.022501

T05270' Z029T660

FIG. 25 TYPICAL TRANSACTION STEPS

1. READER SCANS IMAGE ON CARD, STORES IN MEMORY, EXTRACTS PERSONS ID
2. OPTIONAL: USER KEYS IN PIN NUMBER
3. READER CALLS CENTRAL ACCOUNT DATA NETWORK, HANDSHAKES
4. READER SENDS ID, (PIN), MERCHANT INFORMATION, AND REQUESTED TRANSACTION AMOUNT TO CENTRAL NETWORK
5. CENTRAL NETWORK VERIFIES ID, PIN, MERCHANT INFO, AND ACCOUNT BALANCE
6. IF OK, CENTRAL NETWORK GENERATES TWENTY-FOUR SETS OF SIXTEEN DISTINCT RANDOM NUMBERS, WHERE THE RANDOM NUMBERS ARE INDEXES TO A SET OF 64K ORTHOGONAL SPATIAL PATTERNS
7. CENTRAL NETWORK TRANSMITS FIRST OK, AND THE SETS OF RANDOM NUMBERS
8. READER STEPS THROUGH THE TWENTY-FOUR SETS

8A. READER ADDS TOGETHER SET OF ORTHOGONAL PATTERNS

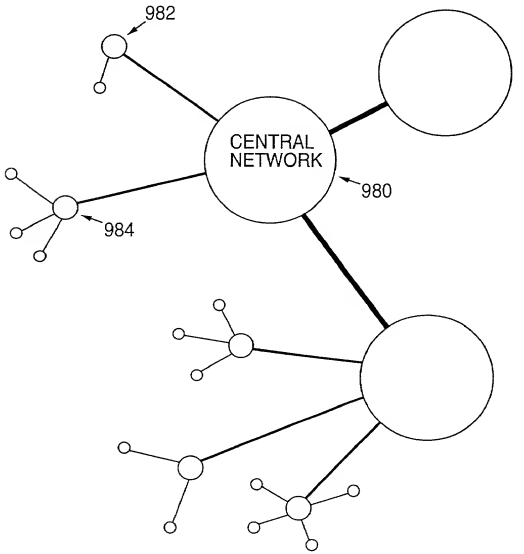
8B. READER PERFORMS DOT PRODUCT OF RESULTANT PATTERN AND CARD SCAN, STORES RESULT

9. READER TRANSMITS THE TWENTY-FOUR DOT PRODUCT RESULTS TO CENTRAL NETWORK
10. CENTRAL NETWORK CHECKS RESULTS AGAINST MASTER
11. CENTRAL NETWORK SENDS FINAL APPROVAL OR DENIAL
12. CENTRAL NETWORK DEBITS MERCHANT ACCOUNT, CREDITS CARD ACCOUNT

09216207.072501

FIG. 26

THE NEGLIGIBLE-FRAUD CASH CARD SYSTEM



A BASIC FOUNDATION OF THE CASH CARD SYSTEM IS A 24-HOUR INFORMATION NETWORK, WHERE BOTH THE STATIONS WHICH CREATE THE PHYSICAL CASH CARDS, 950, AND THE POINT-OF-SALES, 984, ARE ALL HOOKED UP TO THE SAME NETWORK CONTINUOUSLY

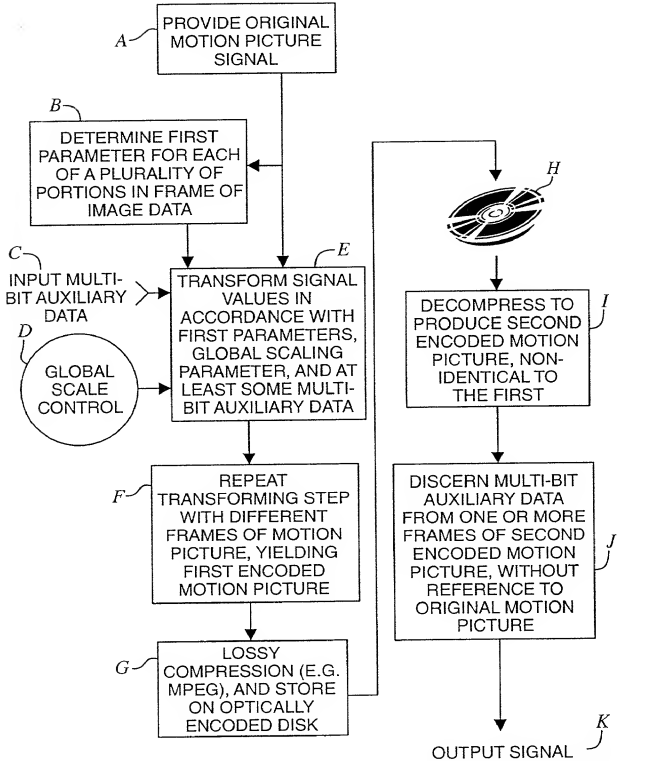

A
PROVIDE ORIGINAL MOTION PICTURE SIGNAL
B
DETERMINE FIRST PARAMETER FOR EACH OF A PLURALITY OF PORTIONS IN FRAME OF IMAGE DATA
C
INPUT MULTI-BIT AUXILIARY DATA
D
GLOBAL SCALE CONTROL
E
TRANSFORM SIGNAL VALUES IN ACCORDANCE WITH FIRST PARAMETERS, GLOBAL SCALING PARAMETER, AND AT LEAST SOME MULTI-BIT AUXILIARY DATA
F
REPEAT TRANSFORMING STEP WITH DIFFERENT FRAMES OF MOTION PICTURE, YIELDING FIRST ENCODED MOTION PICTURE
G
LOSSY COMPRESSION (E.G. MPEG), AND STORE ON OPTICALLY ENCODED DISK
H
I
DECOMPRESS TO PRODUCE SECOND ENCODED MOTION PICTURE, NON-IDENTICAL TO THE FIRST
J
DISCERN MULTI-BIT AUXILIARY DATA FROM ONE OR MORE FRAMES OF SECOND ENCODED MOTION PICTURE, WITHOUT REFERENCE TO ORIGINAL MOTION PICTURE
K
OUTPUT SIGNAL (E.G. RECORD DISABLE SIGNAL)

FIG. 27